DS

616

Digital Communications System General Description

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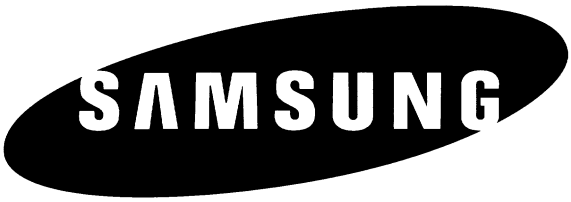

telecommunications

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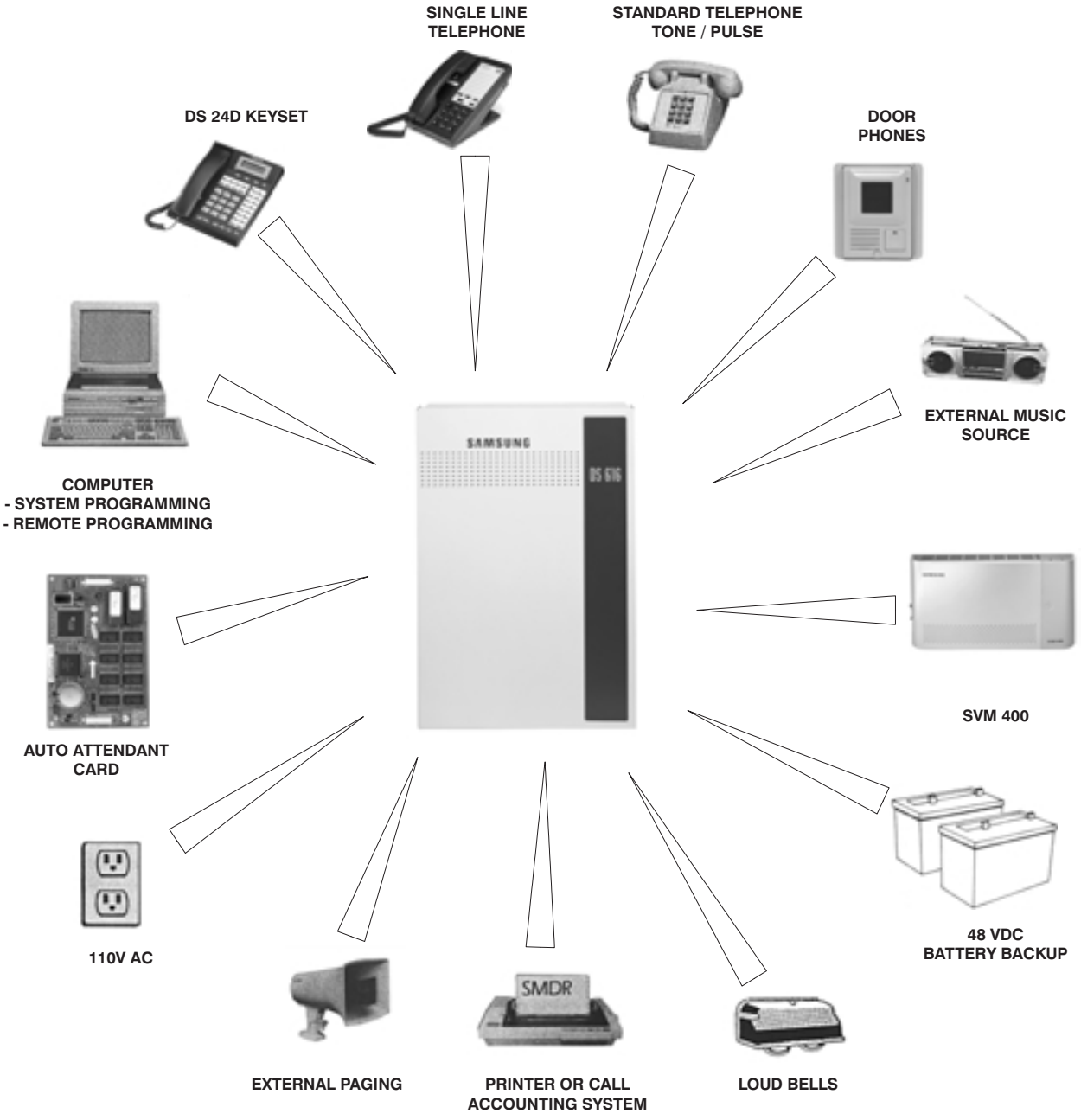
DS 616 GENERAL SYSTEM DIAGRAM



PART 1. SYSTEM OVERVIEW

1.1 INTRODUCTION

The DS 616, Digital Communication System, is a digital telephone system designed for the small to medium-size businesses. DS 616 is easy to install and maintain, convenient to use and flexible to accommodate a variety of features. The system employs the very latest DSP technology (Digital Signal Processors).

DS 616 provides interface cards that allow connection to the public telephone network or private networks. These are generally referred to as trunk cards. In addition to the trunk cards the system provides option boards for serial interface and auto attendant. Two types of telephones can be connected to the systems. Proprietary digital phones called “keyset” connect to digital line interface (DLI) ports of the system. Standard telephone sets generally called “Single Line Sets” connect to single line interface (SLI) ports of the system. In addition, DLI station ports are used to connect peripheral devices such as door-phone interface modules. Miscellaneous circuits are provided to allow such optional features as external paging, music on hold, background music and general-purpose dry contact.

All DS 616 keysets utilize a single PCB with surface-mounted components assuring the highest product quality and long life. In many instances, sophisticated features are made simple through the use of friendly display prompts or push-on/push-off feature keys.

1.2 SIZE AND CONFIGURATION

The DS 616 consists of the Basic Key Service Unit (KSU), option boards, trunk interface cards, interface modules, and digital keysets. The Key Service Unit (KSU) is a single metal cabinet and it begins with 16 station ports: twelve (12) keyset ports and four (4) SLT (single line telephone) ports. Besides, the Basic Key Service Unit (KSU) contains one (1) trunk expansion slot, two option connections and miscellaneous circuits: one (1) external page interface, one (1) general-purpose dry contact and one (1) music interface selectable to internal built-in music (a melody chip) or external music.

Two types of telephones can be connected to the system: proprietary digital stations called “keysets” that connect to DLI (Digital Line Interface) ports and standard telephone sets, generally called “single line telephones”, that connect to SLI (Single Line Interface) ports.

The trunk expansion slot provides an option to select a S3TRK or S6TRK card.

The DS 616 allows two (2) option boards. One provides two (2) serial I/O ports, with analog Caller ID (FSK) decoder (a DSP chip), the second provides AA facilities.

The KSU basic configuration of 16 station is expandable via the trunk expansion slot. The maximum capacity with analog trunks is 6 CO lines and 16 stations.

The system maximum capacity is as follows:

Stations	16 (12 keysets, 4 SLTs)
Analog C.O. Lines	6
Music Channel	1 (Internal or External)
External Page	1
General-Purpose Dry Contact	1
Serial I/O Ports	2 (DB9 connectors)
Auto Attendant Channels	4
Analog Caller ID Channels	8 (Non-Blocking)

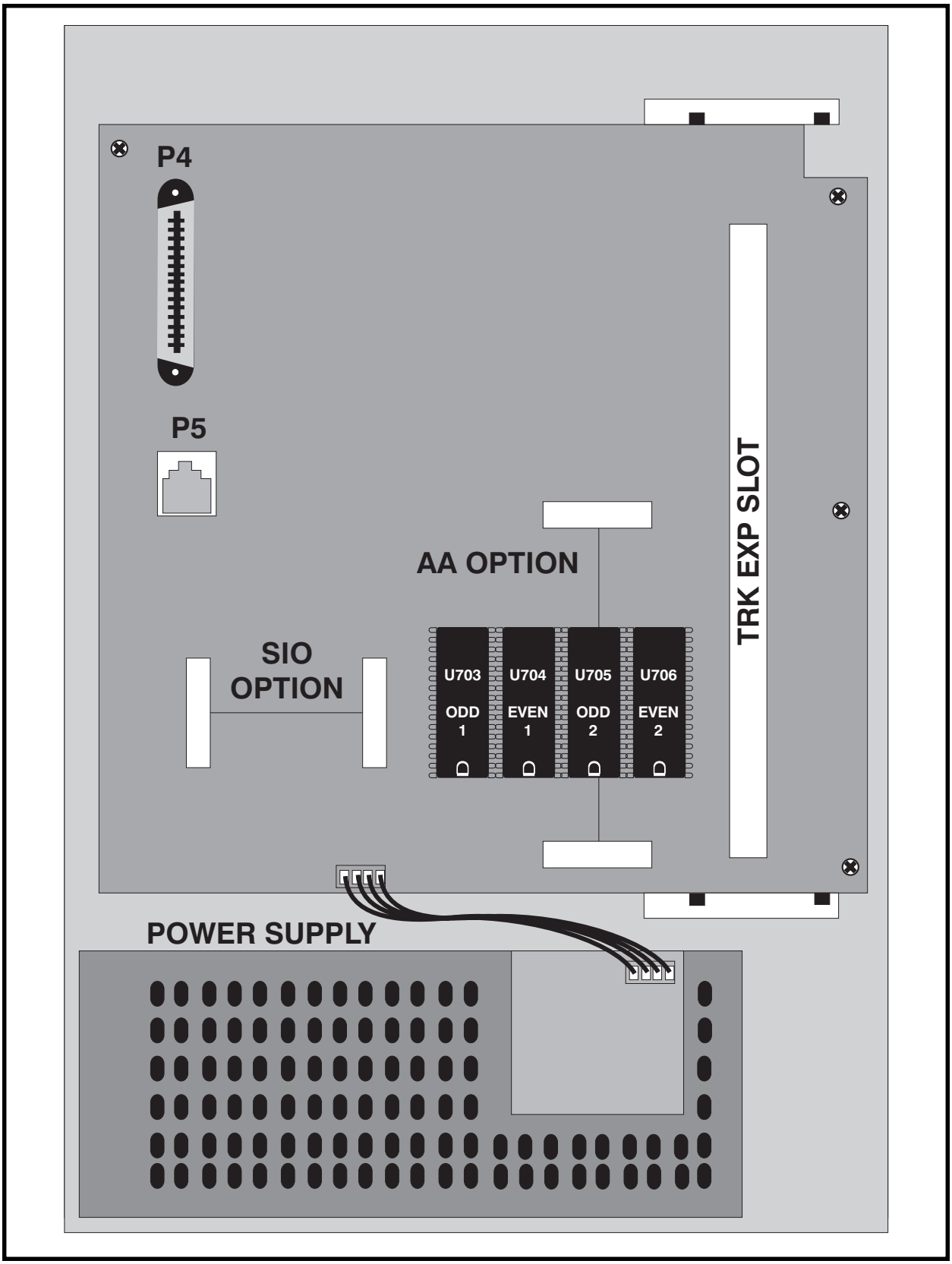
CONFIGURATION NOTES

1. The DS 616 does not support the installation of KDbs (Keyset Daughter Boards) for additional DLI or SLI expansion.
2. Only one (1) trunk expansion card is possible
3. Only one (1) SIO option board and one AA option board are possible.
4. The system cannot accommodate any cards of other Samsung Digital Systems except for the 3 TRK and 6 TRK boards.
5. The analog Caller-ID presentation facility requires the special-designed SIO option board (SIO-2) as well as an analog trunk card (a 3TRK or 6 TRK card).

The DS 616 system has only one expansion slot dedicated to a trunk expansion card:

Trunk Expansion Card Installed	System Configuration
3 TRK Card	316 System (Analog Trunk) — 3 Analog C.O. Lines with Caller ID presentation — 12 keysets (Basic KSU) — 4 Single Line Telephone (Basic KSU)
6 TRK Card	616 System (Analog Trunk) — 6 Analog C,O. Lines with Caller ID presentation — 12 keysets (Basic KSU) — 4 Single Line Telephone (Basic KSU)

DS 616 SYSTEM CONFIGURATION



1.3 TECHNOLOGY

SWITCHING

System switching is accomplished by means of a custom IC “engine” that provides 256 switchable digital channels. The engine is controlled by its own 16-bit Motorola® MC 68000 microprocessor and switching control program. Each of the 256 digital channels is automatically assigned to carry voice or data as required by system operation in a PCM format.

In addition to the 256 channels mentioned above, the systems also utilize Digital Signal Processors (DSPs). Each DSP may be configured by the switching control program as a DTMF sender, a DTMF receiver or as a C.O. tone detector on a per-call basis. DS 616 is equipped with one engine chip which contains four (4) DSP channels. The DSP channels are fully shared throughout the system as a common resource.

MEMORY

The systems operate using stored program control. This program is stored in EPROM chips. All specific customer data is stored in random access memory (RAM) which is protected against the loss of AC power to the system by an on-board battery backup system. It is protected by a super capacitor providing 7 days of memory protection.

MICROPROCESSORS

The DS 616 uses distributed processing. The system’s primary processor is a 16 bit Motorola® MC68000 operating at a clock speed of 8MHz. The secondary level of processing is done in the keysets. The digital keyset uses a Hitachi H8 processor for data communication within the DS 616.

1.4 PROGRAMMING

The DS 616 is self-configuring. This means that when the power is switched ON, the system reads the types and locations of all installed cards and telephones and assigns default data to them. This data provides for system operation within seconds after power is switched ON. All trunks and stations are assigned according to the default numbering plan. This numbering plan is flexible and may be changed to suit customer requirements. The installing technician customizes these default data to meet the end user’s requirements.

The systems can be programmed from any LCD display keyset without interrupting system operation. There are three levels of programming: technician, customer and station. The technician level has access to all programs and can allow the customer access to system programs as needed. Technician and customer access is controlled by different security passcodes and access procedures.

DS 616 also allows the use of a proprietary computer program called PCMMC. This permits a technician to program the system using a personal computer. PCMMC can be used

on-site to modify the customer database or to download (save) the entire customer database to a file. This file can then be saved as a backup and be uploaded when required to restore the database. Through the use of modems, PCMMC can access a DS 616 system remotely (off-site) to make database changes or perform uploads or downloads of the customer database as if the technician were on-site.

PART 2. HARDWARE DESCRIPTIONS

2.1 BASIC KEY SERVICE UNIT

The DS 616 Key Service Unit (KSU) is a single metal cabinet containing the following:

FIGURE 2–1

- A power supply.
- Processing, memory and switching. CPU (68EC000), 2 Mbyte Program Memory, 256 Kbyte Data Memory with a backup super capacitor, real time clock.
- Twelve (12) Digital Keyset Interfaces.
- Four (4) Single Line Telephone Interfaces with loop-disconnect facilities.
- One (1) Internal Music Source or an External Music Interface for Music-On-Hold and Backgroung Music.
- One (1) External Page Interface.
- One (1) General-Purpose Dry Contact.
- A 1.5W sinusoidal ring generator for single line telephones.
- One (1) Trunk Expansion Slot, one (1) SIO Option Connection for SIO2 and one (1) AA Option Connection.
- One (1) Amphenol Connector and one (1) RJ-45 Connector for external connections and other connectors for the Power Supply Unit and External Backup Battery.

2.2 OPTION BOARDS

SIO OPTION BOARD

Two (2) dedicated connectors in the Basic KSU are provided for an SIO. The option board contains two (2) RS232C Serial Interfaces with DB9 connectors for connection to a personal computer, a printer, or a modem—for SMDR or PCMMC. The SIO2 option board is equipped with an 8 channel analog CID signal decoder.

To activate analog CID presentation facility, the SIO2 option board must be installed with an analog trunk expansion card, i.e. 3 TRK card or 6 TRK card.

Only one (1) board can be installed per system.

AA OPTION BOARD

The AA option board is equipped with a 4-channel built-in AA. There are two dedicated connectors in the Basic KSU for the option board. The board has its own processor, 68EC000, 64 Kbyte program memory, 512 Kbyte pre-recorded message memory, 1 Mbyte data and customer message memory and a DSP chip for AA processing.

Only one (1) board can be installed per system.

2.3 TRUNK EXPANSION BOARDS

One slot only is available for trunk expansion purposes.

S3TRK CARD

This card provides three Caller ID-compatible loop start C.O. interfaces.

S6TRK CARD

This card provides six Caller ID-compatible loop start C.O. interfaces.

2.4 STATION EQUIPMENT

DS 24D KEYSET

(See Figure 2–2)

- Built in Speaker Phone
- 24 programmable keys (8 with tri-colored LEDs)
- Four fixed function keys
- 32 character display (2 x 16) with three associated soft keys and a scroll key
- UP/DOWN buttons for digital control of speaker, handset and ringer volumes
- Eight selectable ring tones
- Desk- or wall-mounted
- Available in Dark Grey Only

FIGURE 2–2

SINGLE LINE TELEPHONE

(See Figure 2–3)

- Four fixed function keys: hold, flash, new call, and monitor.
- Data Port: selectable to share station extension or utilize a separate extension
- On hook dialing
- Message Waiting/Ring Indicator
- Desk or wall mounted
- Ring volume control
- Four available ring tones.
- Available in Light Grey and Dark Grey

FIGURE 2–3

Note: This single line telephone set is FCC approved for direct connection to the public telephone network.
FCC # A3LKOR-24627-TE-T REN 0.9B. UL LISTED 19X9 FILE # ETI 8093

Door Phone Interface Module (DPIM) and **Door Phone** (see Figures 2–4 and 2–5)

- The DPIM adapts any DLI circuit for use with the door phone unit
- Commonly used to request entry through locked doors (interior or exterior) or as a room monitoring box
- Provides contact control to be used with customer-provided electric door lock
- The maximum number of door phones available is limited to the number of available DLI ports, not to exceed twelve (12). Note that you should take in consideration the optional SVM 400 voice mail system, which requires two (2) DLI ports.
- Door phone is wall-mounted
- Door phone is weather resistant

FIGURE 2–4

FIGURE 2–5

2.5 OPTIONAL EQUIPMENT

SVM 400
(See Figure 2–6)

- Voice Mail System and Auto Attendant
- Integrates via DLI Ports
- Self Configuring
- Flash Memory
- 2 Ports (Not Expandable)
- 16 User Mailboxes
- 1 Administrator Mailbox
- 2 Hours of Storage

FIGURE 2–6

PART 3. SPECIFICATIONS

The following tables provide technical data for the DS 616 hybrid/key telephone system.

3.1 ELECTRICAL SPECIFICATIONS

AC INPUT	112 (88–132) VAC (48–63 Hz)
POWER CONSUMPTION (MAX)	97 WATTS MAXIMUM FUSE RATING 5 AMP
BTU RATING (MAX)	5.5 BTU/MINUTE
DC OUTPUT	+5 VOLTS 2.5 AMPS MAX -5 VOLTS 0.5 AMPS MAX -56 VOLTS 1.2 AMPS MAXIMUM
BATTERIES	10–40 AMPS 48 VOLTS MAXIMUM CHARGE CURRENT 0.4 A MAXIMUM DISCHARGE RATE 2.5 A

3.2 DIMENSIONS AND WEIGHTS

	HEIGHT	WIDTH	DEPTH	WEIGHT
BASIC KSU	18.5"	12.5"	4.5"	14 lb.
DIGITAL KEYSET	4"	7.4"	9"	1.65 lb.
DOOR PHONE	5"	3.88"	1.25"	6.8 oz.

3.3 ENVIRONMENTAL LIMITS

OPERATING TEMPERATURE	32–104 °F/1–40 °C
STORAGE TEMPERATURE	-13–158 °F/-10.5–70 °C
HUMIDITY	10%-90% NON-CONDENSING

3.4 CABLE REQUIREMENTS

EQUIPMENT	CABLE	AWG	MAX FEET	MAX METERS
DIGITAL KEYSETS	1 PR. TWISTED	24	1300	400
SINGLE LINE STATION	1 PR. TWISTED	24	3000	1 KM
DOOR PHONE	2 PR. TWISTED	24	330*	100
KSU TO DPIM	1 PR. TWISTED	24	800	250

*This is the maximum length of the cable between the door phone and the DPIM. The DPIM can be installed up to 800 feet from the KSU.

3.5 SYSTEM TONES

TONE	FREQUENCIES	CADENCE
DIAL TONE	350 + 440 Hz	CONTINUOUS
RING BACK TONE	440 + 480 Hz	1 sec on + 3 sec off
BUSY TONE	480 + 620 Hz	0.5 sec on + 0.5 sec off
DND/NO MORE CALLS	480 + 620 Hz	0.25 sec on + 0.25 sec off
ERROR TONE	480 + 620 Hz	0.25 sec of each tone
CONFIRMATION TONE	350 + 440 Hz	Three bursts of tone 0.1 sec on + 0.1 sec off
TRANSFER/CONF	350 + 440 Hz	0.1 sec on + 0.1 sec off

3.6 KEYSET KEY LED INDICATIONS

CONDITION	LED COLOR	LED ON	LED OFF
LINE IDLE	OFF	–	OFF
LINE IN USE	RED/GREEN	STEADY	–
RECALL	AMBER	500 ms	500 ms
CALL ON HOLD	RED/GREEN	500 ms	500 ms
RINGING C.O. CALL	GREEN	100 ms	100 ms
RINGING INTERNAL CALL	GREEN	100 ms	100 ms
DND INDICATION	RED	100 ms ON / 100 ms OFF for 500 ms	500 ms

PART 4. FEATURES

SYSTEM FEATURES

- Account Code Entry
  - Forced
  - Voluntary
- All Call Voice Page
- Attention Tone
- Authorization Codes
  - Forced
  - Voluntary
- Auto Attendant†
- Automatic Hold
- Background Music
- Battery Backup (Memory)
- Battery Backup (System)
  - Batteries Not Included
- Caller Identification†
  - Name/Number Display
  - Next Call
  - Save CID
  - Store CID
  - Inquire Park/Hold
  - CID Review List
  - Investigate
  - Abandon Call List *(100)*
  - CID on SMDR
  - Number to Name Translation *(200)*
- Call Forwarding
  - All Calls
  - Busy
  - Forward DND
  - No Answer
  - Busy/No Answer
  - Follow Me
  - External
  - To Voice Mail
- Call Hold
  - Exclusive
  - System
  - Remote
- Call Park and Page
- Call Pickup
  - Directed
  - Groups *(8)*
- Call Waiting/Camp-On
- Centrex/PBX Use
- Chain Dialing
- Class of Service (Day/Night)
- Common Bell Control
- Conference
  - Add On *(5 Party)*
  - Unsupervised
- Data Security
- Database Printout
- Day/Night Ring Assignments
- DIL to a Hunt Group
- Direct Inward System Access (DISA)
- Direct Trunk Selection
- Directory Names
- DISA Security
- Distinctive Ringing
- Door Lock Release *(Programmable)*
- Door Phones
- Door Phone Night Ring
- Executive Barge-In *(Override)*
  - Station or Trunk
  - With/Without Warning Tone
- Executive/Secretary Pooling
- External Music Interface
- External Page Interface
- Fax Compatibility
- Flash Key Operation
- Flexible Numbering
- Flexible Ringing
  - Day Ring Assignments
  - Night Ring Assignments
- Hold Recall to Operator
- Hot Line
- In Group/Out of Group
- Incoming Call Distribution
- Incoming/Outgoing Service
- Individual Line Control
- Internal Page (4 Zones)
- Least Cost Routing
- Live System Programming
  - From any Display Keyset
  - With a Personal Computer
- Loud Bell Control
- Meet Me Page and Answer
- Message Waiting Indications
- Microphone On/Off per Station
- Music on Hold—Flexible
- Night Service
  - Automatic
  - Manual
- Off-Hook Call Alert
- Operator Group
- Outgoing Call Restriction
- Overflow
  - Operator
  - Station Group
- Paging
  - Internal Zones *(4)*
  - External Zone *(1)*
  - All Internal
  - External
  - Page All
- Prime Line Selection
- Private Line Assignment
- Programmable Line Privacy
  - /1A2 Operation
- Programmable Timers
- Recalls
- Remote Programming—PC
- Ring Generator
- Ring Over Page
- Single Line Connections
- Speed Dial Numbers *(500)*
  - Station List *(50 Max)*
  - System List *(300 Max)*
- Speed Dial by Directory
- Station Hunt Groups *(10)*
  - Distributed
  - Sequential
  - Unconditional
- Station Message Detail Recording (SMDR)
- Station Pair
- SVM 400–Voice Mail Integration
- System Directory
- Toll Restriction
  - By Day or Night
  - By Line or Station
  - Eight Dialing Classes
  - Special Code Table
- Toll Restriction Override
- Tone or Pulse Dialing
- Transfer
  - Screened/Unscreened
  - Voice Mail Transfer Key
  - With Camp-On
- Trunk Groups *(4)*
- Unlisted Speed Dial Numbers
- Universal Answer
- Voice Mail Integration
- Walking Class of Service

†Requires optional hardware and/or software. Ask your dealer for details.

4.1 SYSTEM FEATURE DESCRIPTIONS

ACCOUNT CODE ENTRY

Station users may enter an account code (maximum 12 digits) before hanging up from a call. This account code will appear in the SMDR printout for that call record. Keyset users may enter this code using an account (ACCT) key without interrupting a conversation. Single line telephone users must temporarily interrupt the call by hook-flashing and dialing the feature access code. Account codes can be up to 12 digits long.

FORCED

When forced, they are always verified from a system list of 200 entries. Account codes are always printed on the SMDR report. They can contain digits 0–9.

VOLUNTARY

Users may elect to enter an account code for any call. When a user voluntarily dials an account code it is only verified from the system list of 500 entries when the ACCT key is pressed before the call is made. If the ACCT key is pressed during a call the account number is not verified. They can include digits 0–9, star (✱) and #.

ALL CALL VOICE PAGE

Users can page all internal and all external paging zones at the same time by dialing the All Page code. Keysets may be restricted from making or receiving pages in system programming. A maximum of 12 keysets can be programmed to receive page announcements.

ATTENTION TONE

To get your attention, a brief tone precedes all page announcements and intercom voice calls. There are separate programmable duration timers for page and voice announce tones.

AUTHORIZATION CODES

Authorization codes are used to give permission to make a call. These four digit authorization codes can be either forced or voluntary. When used, authorization codes will automatically change the dialing station's class of service to the level assigned to the authorization code. Authorization codes may be programmed to print or not print on SMDR.

FORCED

When a station is programmed for forced authorization, the user must always enter this code before dialing is allowed. The dialed authorization code is verified from a system list of 30 entries.

VOLUNTARY

Any station user can always enter an authorization code before they begin dialing. The dialed authorization code is verified from a system list of 30 entries.

AUTO ATTENDANT

The DS AA card for the DS 616 includes four ports of auto attendant for simultaneous answering and call processing. Sixteen professionally recorded prompts inform callers of the progress of their calls. Several examples are the following: “I’m sorry. There is no answer”, “That station is busy” and “Invalid number. Please try again”, Two minutes of battery-backed random access memory (RAM) provide up to 48 customer recordings for announcements or greetings. Twelve individual greeting boxes, each with its own dialing options, allow you to build call routing branches as needed. Callers are routed through the branches by dialing extension numbers or single digits.

NOTE: Requires optional hardware and/or software. Ask your dealer for details.

AUTOMATIC HOLD

While a keyset user is engaged on an outside (C.O.) call, pressing another trunk key, route key or CALL button automatically places the call on hold when Automatic Hold is enabled. Pressing the transfer key, conference key, page key or a DSS key always automatically places a C.O. call on hold. Intercom calls can be automatically held only by pressing the transfer key or the conference key. Each keyset user can enable or disable Automatic Hold.

BACKGROUND MUSIC

Keyset users may choose to hear music through their keyset speakers when optional external sources are installed. Each user may adjust this level by the use of a volume control program at the selected keyset.

BATTERY BACKUP (MEMORY)

In the event that power is lost to the system, all customer data contained in memory is retained by the use of a “super capacitor” for approximately seven days. In addition, the PCMMC computer program may be used to produce a backup copy of the customer data.

BATTERY BACKUP (SYSTEM)

Connect a customer-provided 48 VDC battery source and the system is fully operational when AC power is interrupted. When power is restored, the system recharges the batteries. Calls in progress are not interrupted when the system switches to batteries.

CALLER IDENTIFICATION

CALLER ID

Caller ID requires that the SIO2 card be installed in the DS 616 KSU. Caller ID service must also be provided by your local telephone company. The availability of the calling party name or number depends on the type of CID service offered by your local telephone company. The Caller ID feature is dependent on having an LCD keyset to show the name or number in the top line of the display.

NAME/NUMBER DISPLAY

Each LCD keyset user can decide if he/she wants to see the CID name or CID/ANI number in the display. Regardless of which one is selected to be seen first, the NND key is pressed to view the other pieces of CID information.

NEXT CALL

In the event that you have a call waiting or a camped-on call at your keyset, you can press the NEXT key to display the Caller ID information associated with this next call in queue at your station. Either the CID name or CID number will show in the display depending on your NND selection.

SAVE CID

At any time during an incoming call that provides CID information, you may press the SAVE key. This saves the CID number in the Save Number feature. Pressing the SAVE number redial key will dial the CID number. The system must be using Least Cost Routing (LCR) to dial the saved number.

STORE CID

At any time during an incoming call that provides CID, you may press the STORE key. This saves the CID number as a speed dial number in your personal speed dial list. The system must be using LCR to dial the stored number.

INQUIRE PARK/HOLD

Having been informed that an incoming call is on hold or has been parked, you may view the Caller ID information before you retrieve the call. This will influence how you choose to handle the call.

CID REVIEW LIST

This feature allows display keyset users to review CID information for calls sent to their stations. This list can be from ten to fifty calls in a first in, first out basis. The list includes calls that you answered and calls that rang your station but that you did not answer. When reviewing this list, you can press one button to dial the person back. The system must be using LCR to dial the stored number.

INVESTIGATE

This feature allows selected stations with a special class of service to investigate any call in progress. If CID information is available for an incoming call, you will know to whom this station user is speaking. On outgoing calls, you can see who was called. After investigating, you may barge-in on the conversation, disconnect the call or hang up.

ABANDON CALL LIST (100)

The system has a system-wide abandon call list that stores CID information for the last 100 calls that rang but were not answered. The list is accessed using the operator's passcode. When reviewing this list, you are provided options to CLEAR the entry or DIAL the number. You can use the NND key to toggle between the CID name, CID number and the date and time the call came in. The system must be using LCR to dial numbers from the abandon call list.

CID ON SMDR

The Station Message Detail Records report can be set to include CID name and CID number for incoming calls. This format expands the printout to 113 characters. Use a wide carriage printer or an 80 column printer set for condensed print.

NUMBER TO NAME TRANSLATION (200)

The system provides a translation table for 200 entries. When the CID number is received, the table is searched. When a match is found, the system will display the corresponding name. This will allow users in areas that do not support deluxe Caller ID to provide names for regular callers.

CALL FORWARDING

This feature allows the user to redirect (forward) incoming calls. The calls can be redirected to the attendant, a hunt group, voice mail, external number or another station user. If the destination station is in Do Not Disturb (DND), the calling party will receive DND/Reorder tone. Calls cannot be forwarded to a door phone.

ALL CALLS

This type of forwarding is not affected by the condition of the station. All calls are immediately redirected to the designated destination. If desired, the destination station may redirect the call back to the forwarded station by using the transfer feature. The forwarded station user can continue to originate calls as usual. If no key is programmed as Forward All, the transfer key lights steady when a Forward All condition is set.

BUSY

This feature forwards all calls only when the station set is busy. The station user can originate calls as usual.

FORWARD DND

This feature works with the Do Not Disturb feature. This allows calls directed to a station in Do Not Disturb or One Time Do Not Disturb to forward immediately to another destination.

NO ANSWER

This feature forwards calls that are not answered within a preprogrammed time. The user can originate calls as usual and receive calls if present. The timer is programmable on a per-station basis to allow for differences in individual work habits.

BUSY/NO ANSWER

This feature allows the station user to use both types of forwarding simultaneously, provided the destinations have already been entered in the usual manner.

FOLLOW ME

This feature allows the user to forward all calls from another station to the user's station or change the forward destination to the user's current location.

EXTERNAL

This feature forwards C.O. calls to an external number via a central office trunk if allowed by class of service. These C.O. calls forward only after the programmable external call forward delay timer expires.

TO VOICE MAIL

Each station may be programmed to allow or deny the ability to forward intercom calls to voice mail. When denied, valuable message time in the voice mail system can be saved.

CALL HOLD

EXCLUSIVE

Outside calls can be placed on exclusive hold at any keyset by pressing HOLD twice during a call. Calls placed on exclusive hold can only be retrieved at the keyset that placed the call on hold. Intercom calls are always placed on exclusive hold.

SYSTEM

Outside calls can be placed on system hold at any station. Users may dial the access code or press the HOLD button. Calls on system hold may be retrieved at any station.

REMOTE

Outside calls can be placed on hold at a remote station. This feature allows calls to be answered at one keyset and placed on hold at another station. This allows time

for the user to proceed to that station or allows the party that the call was intended for to have that call placed at their station. The call or trunk button will flash at the remote hold station.

CALL PARK AND PAGE

Each C.O. line has its own park zone. This simple method eliminates confusion and ensures that a park zone is always available. Pressing the PAGE key parks the call automatically. There are no extra buttons to press and there is no lost time looking for a free zone.

CALL PICKUP

DIRECTED

With directed call pickup, users can answer calls ringing at any station by dialing a code plus that station's extension number or by pressing the feature button and then dialing the extension.

GROUPS (8)

In addition, calls can be picked up from a station group in a similar manner. The group pickup feature allows users to answer any call ringing within any pickup group. There are 8 pickup groups available. A station cannot be in more than one pickup group. To use this feature, station users either dial the access code or press the assigned feature button followed by the pickup group number.

CALL WAITING/CAMP-ON

Busy stations are notified that a call is waiting (camped-on) when they receive a tone. The tone is repeated at a programmable interval. Keysets receive an off-hook ring signal through the speaker and single line stations receive a tone in the handset. The volume of the camp-on tone can be set by the station user. Camped-on calls follow Forward No Answer if a Forward No Answer destination has been set.

CENTREX/PBX USE

CENTREX and PBX lines can be installed in lieu of central office trunks. CENTREX and PBX feature access codes including the command for hook-flash (FLASH) can be stored under one touch buttons. Toll restriction programming can ignore PBX or CENTREX access codes so that toll calls can be controlled when using these services.

CHAIN DIALING

Keyset users may manually dial additional digits following a speed dial call or chain together as many speed dial numbers as are required.

CLASS OF SERVICE (Day/Night)

The system allows a maximum of 10 station classes of service. Each class of service can be customized in memory to allow or deny access to features and to define a station's dialing class. Each station can be assigned different classes of service for day and night operation.

COMMON BELL CONTROL

The system is equipped with one programmable relay. This relay provides a dry contact pair to control a customer-provided bell or common audible device. This contact must be programmed as a member of a station group and may provide steady or interrupted closure.

CONFERENCE

The system allows six simultaneous conferences.

ADD-ON (5 PARTY)

Any combination of up to five parties (stations or outside lines) can be joined together in an add-on conference. Parties may be eliminated or added after a conference has been established.

UNSUPERVISED

A station user may set up a conference with two or more outside lines and then exit the conference leaving the outside lines connected in an unsupervised (trunk to trunk) conference.

DATA SECURITY

Single line extensions used with modems and facsimile machines can be programmed so that they will not receive any system-generated tones that would disrupt data transmissions. In addition, these devices receive DS 616 C.O. ringing pattern instead of intercom ring pattern. Devices connected to an SLI card receive a disconnect signal upon termination.

DATABASE PRINTOUT

A copy of the customer database can be obtained by using PCMMC. This information can be directed to a printer or the PC screen and may be done either on-site or remotely. A complete database or specific data blocks may be obtained.

DAY/NIGHT RING ASSIGNMENTS

Each C.O. line may be programmed to ring selected stations during day operation and different stations when the system is placed in night service.

DIL TO A HUNT GROUP

Lines may be programmed as direct in lines (DIL) to a station hunt group. For example, service parts or sales lines can ring directly to the designated departments for immediate answer.

DIRECT INWARD SYSTEM ACCESS (DISA)

Users can call in on specific DISA lines at any time, input a security code and receive system dial tone. Users can now place internal calls or if permitted, calls using C.O. lines. The caller must have a tone dial phone and know his/her DISA security code. DISA lines can be used as both way lines or incoming only and may

be active in day mode, night mode or both. The C.O. lines used for DISA must have disconnect supervision.

DIRECT TRUNK SELECTION

Each station can be allowed access to or denied access from a trunk or trunk group by access code when LCR is activated. When restricted, the station user must use a trunk key or a route key.

DIRECTORY NAMES

Each station, station group and C.O. line may be assigned a directory name (maximum 11 characters). In addition, each personal speed dial number, system speed dial number and entry in the DID translation table may be assigned a name (maximum 11 characters). These names are displayed during calls with these ports and in the case of station and speed dial names, can be used to originate calls. See the Dial by Name feature (Station Features).

DISA SECURITY

Telephone fraud and long distance theft continue to increase; therefore, we have introduced a DISA security system. If an incorrect DISA passcode is entered repeatedly (as is the case with “hackers”), the DISA system can be automatically disabled temporarily. Both the number of incorrect passcode attempts and the time that DISA is disabled are programmable. In addition, all failed attempts to access DISA print on SMDR (if provided) with a “DE” DISA error flag.

DISTINCTIVE RINGING

A user knows the type of call received by the type of ring heard. Outside calls have a single ring repeated while internal calls have a double ring repeated.

DOOR LOCK RELEASE (PROGRAMMABLE)

After answering a call from the door phone, users can dial a code to activate a contact closure. This can be used to operate a customer-provided electric door lock release mechanism. The contact closure timer is programmable from 100–2500 ms.

DOOR PHONES

The door phone interface module (DPIM) provides for connection of a door phone to a DLI port. Pressing the button on the door phone produces a distinctive ring (three short rings repeated) at the assigned station or station group. If not answered within a programmable time, the system releases the door phone and stops the ringing. Stations may call the door phone directly and monitor the surrounding areas.

DOOR PHONE NIGHT RING

The ring destination of door phone calls may be different at night than during the day. For example, large factories may want these calls directed to a security desk after hours.

EXECUTIVE BARGE-IN (OVERRIDE)

The feature allows specially programmed stations with a barge-in key to override the automatic privacy of another station or outside trunk. Programming allows barge-in with or without a warning tone. Stations may also be programmed as “secure” so that they cannot be barged-in on.

WITH WARNING TONE

When the barge-in with tone option is set, the barging-in keyset has its microphone on and the barged-in on station receives an override display. A double burst of warning tone sounds and repeats every ten seconds. This feature does not work from single line sets.

WITHOUT WARNING TONE

When the barge-in without tone option is set, the barging-in keyset has its microphone muted and the barged-in on station does not receive an override display. This feature does not work from single line sets.

WARNING: BARGE-IN WITHOUT TONE MAY VIOLATE STATE OR FEDERAL LAWS CONCERNING THE RIGHT TO PRIVACY. SAMSUNG TELECOMMUNICATIONS AMERICA IS IN NO WAY RESPONSIBLE FOR THE POSSIBLE MISUSE OF THIS FEATURE.

EXECUTIVE/SECRETARY POOLING

Each keyset may be defined as a BOSS or a SECRETARY in system programming. Each BOSS can have up to four SECRETARIES and each SECRETARY can have up to four BOSSES. These arrangements are known as executive/secretary pools. There can be multiple pools in a system. When a BOSS is in DND, all calls to the BOSS ring the first SECRETARY assigned to that BOSS; if that SECRETARY is busy, the call hunt to the next available SECRETARY assigned to that BOSS. If the SECRETARY must communicate with the BOSS while he/she is in DND, pressing the corresponding BOSS button on the SECRETARY’s keyset results in an Auto Answer intercom call being made to the BOSS (providing the BOSS is free). A station can only be the BOSS of one SECRETARY pool. In addition, a station cannot be in more than one pool.

EXTERNAL MUSIC INTERFACE

The system provides an interface for connecting a customer-provided external music source. This interface can be used for background music, station music on hold or trunk music on hold.

EXTERNAL PAGE INTERFACE

The system provides an interface for connecting customer provided external paging equipment. This interface has s 600 ohm impedance.

FAX COMPATIBILITY

By connecting the facsimile machine to any single line station port, there is no need for a dedicated FAX line. Incoming calls can be manually transferred to the facsimile machine. Any line in the system may be selected to send a FAX.

FLASH KEY OPERATION

While a user is on an outside line, pressing the FLASH key will flash the central office or PBX. This is used for custom calling features on C.O. lines or in conjunction with CENTREX/PBX operation. System programming allows individual flash times for C.O. and PBX lines. When C.O. or PBX flash is not required, setting the timers for two seconds releases the existing call and returns dial tone to make a new call.

FLEXIBLE NUMBERING

System programming allows stations to have two, three or four digit extension numbers beginning with the digit 2 or 3. Default extension numbers begin with 201. Station hunt group access codes can be two or three digits beginning with the digit 5. These can be changed but it will affect other feature access codes. All user guides are written using the default numbering plan.

FLEXIBLE RINGING

Each C.O. line can be programmed to ring at any station or station group. Each line can be assigned a day ring destination and a night ring destination.

HOLD RECALL TO OPERATOR

Lines left on hold will recall the stations that put them on hold after a preprogrammed period of time. If the station does not answer the recall, it will return to the system operator.

HOT LINE

Stations can be programmed to call a pre-defined station or station group whenever that station goes off-hook. A hot line delay timer of 1–250 seconds can be programmed to allow sufficient time to make a different call.

IN GROUP/OUT OF GROUP

Individuals assigned to a station hunt group may temporarily remove their telephones from the group by pressing the In/Out of Group button providing that there is someone still in the group. Stations out of a group will not receive calls to that group but will continue to receive calls to their individual extension numbers. When desired, the user may put him/herself back into the group by pressing the button again. Users who do not have this button may dial the access code and the group desired. A station user is allowed to be in several groups, providing a key and the extender of that group are assigned for each group on the user's phone.

INCOMING CALL DISTRIBUTION

Incoming calls can be assigned to ring a distributed station hunt group. This allows all members of the group to share the call load.

INCOMING/OUTGOING SERVICE

Outside lines are available for incoming or outgoing service. Programming allows any outside line to be used for incoming calls only, outgoing calls only or both way service.

INDIVIDUAL LINE CONTROL

Each station in the system can be individually programmed to allow or deny dialing out as well as allow or deny answering for each outside line.

INTERNAL PAGE (FOUR ZONES)

Any keyset may be assigned to one of four internal page zones. Any station may page the keyset speakers in any zone using the corresponding access code. By dialing internal paging access code, then ✱, all internal zones are accessed.

LEAST COST ROUTING

Least Cost Routing (LCR) is the ability to automatically select the most cost effective central office route for the outside number dialed by any station. The DS 616 LCR program includes the following features:

- Option to use or not use LCR on a tenant basis
- Programmable LCR access code
- Digit analysis table 1000 entries each with ten digits
- Routing by time of day and day of week (4 time bands per day)
- Routing according to individual station class
- Modify digits table 100 entries
- Flexible trunk group advance timer
- Option to use or not use trunk group advance warning tones

LIVE SYSTEM PROGRAMMING

The system can be programmed from any display keyset or personal computer without interrupting normal system operation. There are three levels of programming: technician, customer and station. The technician level has access to all programs and can allow the customer access to system programs as needed. Technician and customer access are controlled by different security passcodes. Programming from a PC requires the PCMMC program.

LOUD BELL CONTROL

Connecting any audible device (that operates on a normal tip and ring circuit) to a single line station port will provide external loud ringing of incoming calls. For added flexibility, this station port may be programmed for both day and night ringing.

MEET ME PAGE AND ANSWER

After a user makes a Meet Me Page, the user may remain off-hook to allow the paged party to meet the user for a private conversation.

MESSAGE WAITING INDICATIONS

When calling a station and receiving a busy signal or the no answer condition, the caller can leave an indication that a message is waiting. The message button will flash red at the messaged keyset. A single line phone will receive a distinctive message waiting dial tone. Five message waiting indications can be left at any station.

MICROPHONE ON/OFF PER STATION

The microphone can be disabled at any keyset. When the microphone is disabled, the keyset cannot use the speakerphone, although on-hook dialing and group listening are still possible.

MUSIC ON HOLD—FLEXIBLE

The system provides for either an external music on hold device, internally-generated tones or no music, to be received by stations or C.O. lines placed on hold. If no service is desired, each station/trunk can be programmed to receive either a 50 ms tone or no music. The system generated tone is a beep every 3.5 seconds.

NIGHT SERVICE

The DS 616 provides separate ringing locations for all trunks in both the day and the night modes.

AUTOMATIC

Automatic night service allows each tenant to automatically go in and out of night service according to the system clock. There are separate time options available for each day of the week. This feature can be overridden by a manual night service key and passcode.

MANUAL

The operator presses the NIGHT key and then dials a passcode to change day mode to night mode operation.

OFF-HOOK CALL ALERT

Users may call a busy keyset and offer it another call by sending an off-hook ring signal. Busy stations may also be alerted to important or emergency calls by receiving a ring burst each time the DSS key is pressed.

OPERATOR GROUP

The operator group can contain 16 stations to answer incoming calls. Calls to this group can be set for distributed, sequential or unconditional ringing. Operators can use the In/Out of Group feature to meet flexible operator requirements.

OUTGOING CALL RESTRICTION

Selected stations may be restricted from placing outside calls. They can, however, receive calls.

OVERFLOW

OPERATOR

When calls ringing a operator group go unanswered, they can overflow to another destination after a programmed period of time. The operator group has its own timer. The overflow destination can be a station or station group.

STATION GROUP

When calls ringing a station group go unanswered, they can overflow to another destination after a programmed period of time. Each station group has its own timer. The overflow destination can be a station or station group.

PAGING

The system software allows the use of four (4) internal and one (1) external paging zones. Stations can page, all internal zones, the external zone or all zones simultaneously. Using system programming, each station may be allowed or denied the abilities to make and/or receive page announcements to any zone or combination of zones.

PRIME LINE SELECTION

Any station can be programmed to select a specific line, line group, telephone number, station or station group.

PRIVATE LINES

For private line use, stations can be prevented from dialing and/or answering any line.

PROGRAMMABLE LINE PRIVACY

Each outside line can be programmed to ignore the automatic line privacy. This allows up to four other parties to join your conversation by simply pressing the line button. This is similar to 1A2 key telephone operation.

PROGRAMMABLE TIMERS

There are over 50 programmable system timers to allow each installation to be customized to best fit the end user's application.

RECALLS

Calls put on hold, transferred or camped-on to any station will recall to the originating station if not answered within a programmable time. A recall that goes unanswered for the duration of the attendant recall timer will recall to the system operator group. Hold, transfer, camp-on and attendant recalls have individual programmable timers. Calls recalling to buttons with tri-colored LEDs will flash amber.

REMOTE PROGRAMMING—PC

Remote programming allows the technician to access the system database from a remote location for the purpose of making changes to the customer data. Customer-provided modems and a PC using an optional software package will be needed to implement this feature.

RING GENERATOR

The system provides ringing voltage required for single line telephones and other tip and ring devices. The ring generator needed to ring single line telephones is built into the basic power supply so that there is no need for additional purchase of optional equipment.

RING OVER PAGE

Any outside line can be programmed to ring over a customer-provided paging system. Outside lines, door phones and station groups may ring over page in the day or night mode.

SINGLE LINE CONNECTIONS

Single line ports allow connection of a variety of single line telephones plus facsimile machines, answering machines, loud bells, computer modems, cordless phones and credit card machines. When connecting customer-provided equipment to these extensions, compatibility should be checked out before purchase to ensure correct operation. Central office ring cadence can be selected for SLT stations. This is helpful when optional devices cannot detect DS 616 intercom ring cadence.

SPEED DIAL NUMBERS (500)

A library of 500 speed dial numbers may be allocated as needed. The system list can have up to 300 numbers and each station can have up to 50 numbers. Speed dial numbers are assigned in blocks of ten. Each speed dial number may contain up to 24 digits.

SPEED DIAL BY DIRECTORY

The DS 616 system provides the user with the ability to look up a speed dial number and place the call. There are three speed dial selections: personal, system and station. This feature can be used with the soft keys on the display keysets or as a programmable button.

STATION HUNT GROUPS (10)

System programming allows up to 10 station hunt groups. One of three ring patterns—sequential, distributed and unconditional—is available for each group. Each unconditional group may contain a maximum of 16 stations. A station may be assigned to more than one group. The default directory numbers to call these groups are 501–509. Group 500 is reserved for the operator group and is called by dialing "0." Each station group has its own recall timer for calls transferred to that group.

STATION MESSAGE DETAIL RECORDING (SMDR)

The system provides, via the optional SIO2 card records of calls made, received and transferred. Connecting a customer-provided printer or call accounting system will allow collection of these records. Each call record provides the following details: station number, outside line number, start date, start time, duration of call, digits dialed (maximum 18) and an account code if entered. The system may print a header followed by 50 call records per page or send continuous records with no header for use with a call accounting machine. The SMDR format contains many options that allow it to be customized for a company's individual needs. Options to print include incoming calls, outgoing calls, in and out of group status, change in DND status and authorization codes.

STATION PAIR

This feature allows stations to be assigned as a "pair". That is to say a primary and secondary extension. Calling the primary station will make both stations ring. Selected features, such as Message Notification, DND, Callback and Class of Service, act as one station. This is convenient when an individual has two offices or an office extension and a cordless extension. Note that not all system features are applicable to station pairs. Features designed for a single user may conflict with paired station.

SVM 400–VOICE MAIL INTEGRATION

SVM 400, a proprietary Samsung Voice Mail System, offers a direct link to the DS 616, via DLI ports, for complete voice mail operation. Utilizing DLI ports for integration to the DS 616, the SVM 400 uses the same IPC messaging as the DS 616. This design creates smoother, more accurate operation. The SVM 400 can also be used for Auto Attendant functionality, to compliment the voice mail system, or as a stand alone Auto Attendant.

SYSTEM DIRECTORY

Each station, station group and outside line can have an 11 character directory name. This name will appear on keyset displays to provide additional information about lines and stations.

TOLL RESTRICTION

There are 200 allow and 200 deny entries of 11 digits each. Each of these entries can apply to dialing classes B, C, D , E, F and G. Expensive 976, 1-900, 411 and operator-assisted calls, as well as specific area and office codes, can be allowed or denied on a per-class basis. Class A stations have no dialing restrictions and Class H stations cannot make outside calls. Any outside line may be programmed to follow station toll restriction or follow the toll restriction class assigned to it. Each station and trunk can have a day dialing class and a night dialing class.

SPECIAL CODE TABLE. A Special Code Table of ten entries (four digits each) allows use of telephone company features such as CID blocking (*67) or call wait-

ing disable (*70) without interference to toll restriction or LCR. The Special Code table allows use of these custom calling features on a per call basis.

TOLL RESTRICTION OVERRIDE

Program options allow system speed dial numbers to follow or bypass a station's toll restriction class. In addition, users may make calls from a toll restricted station by using the walking class of service or authorization code feature.

TONE OR PULSE DIALING

Outside lines can be programmed for either tone or pulse dialing to meet local telephone company requirements.

TRANSFER

System operation permits station users to transfer calls to other stations in the system. Transfers can be screened, unscreened or camped-on to a busy station.

TRUNK GROUPS (4)

Outside lines can be grouped for easy access by dialing a code or pressing a button. There are 4 trunk groups available. Access codes are 9 and 80–82.

UNIVERSAL ANSWER

Station users may dial the Universal Answer code or press the UA key to answer any outside lines programmed to ring the UA device. The UA device can be a station, group of stations, common bell or ring over page.

UNLISTED SPEED DIAL NUMBERS

System speed dial numbers 90–99 and each station user's personal speed dial numbers 1 and 2 will not be displayed when used. This will ensure the privacy of these telephone numbers and prevent unauthorized use. However, they will be printed out on the SMDR report.

VOICE MAIL INTEGRATION

The DS 616 system uses DTMF tones (inband signaling) to communicate with any compatible voice mail system. Stations can call forward to a voice mail system. When answered, the system will send DTMF tones routing the caller directly to the called station user's mailbox. Keyset users can press one button to retrieve messages from the voice mail system. A Voice Mail Transfer key permits keyset users to easily transfer a caller directly to an individual voicemail box without navigating through menus.

WALKING CLASS OF SERVICE

This feature allows users to make calls or use features from a station that is restricted. The users may either use the WCOS feature code or the authorization code feature. Both methods change the class of service to correspond with the station passcode or authorization code that is dialed. After the call is completed, the station returns to its programmed class of service.

STATION FEATURES

APPOINTMENT REMINDER
ATTENDANT STATION
AUTO ANSWER
AUTOMATIC HOLD
AUTOMATIC PRIVACY
BACKGROUND MUSIC
BUSY LAMP FIELD (BLF)
BUSY STATION CALLBACK
CALL FORWARD
- ALL CALLS
- BUSY
- DND
- FOLLOW ME
- EXTERNAL
- NO ANSWER

CALL PICKUP
DIAL BY NAME
DIRECT STATION SELECTION (DSS)
DO NOT DISTURB *(DND)*
DOOR LOCK RELEASE
EXCLUSIVE HOLD
GROUP LISTENING
HANDSET VOLUME CONTROL
HEADSET OPERATION
HEARING AID COMPATIBLE
LINE QUEUING WITH CALLBACK
LINE SKIPPING
MESSAGE WAITING LIGHT/INDICATION
MUTE MICROPHONE/HANDSET
OFF-HOOK RINGING
OFF-HOOK VOICE ANNOUNCE
ONE TIME DO NOT DISTURB
ONE TOUCH DIALING KEYS
ON-HOOK DIALING
PROGRAMMABLE KEYS
PROGRAMMED STATION MESSAGES
PROTECTION FROM BARGE-IN
PULSE TO TONE SWITCHOVER
REDIAL
- AUTO RETRY
- LAST NUMBER
- SAVE NUMBER

REMOTE HOLD
RING MODES
RINGING LINE PREFERENCE
SPEAKERPHONE
STATION CALLBACK
STATION LOCK
STRAIN RELIEF CHANNELS
TRI-COLORED LIGHTS
VOLUME SETTINGS
WALL-MOUNTABLE KEYSETS

†Requires optional hardware and/or software. Ask your dealer for details.

4.2 STATION FEATURE DESCRIPTIONS

APPOINTMENT REMINDER

Keysets with an alarm key can be used like an alarm clock. When programmed for a specific time, the keyset will sound a distinctive ring to remind the user of meetings or appointments. Alarms can be set for “today only” or for every day at the same time. Up to three alarms may be set at each keyset. Display keysets can also show a programmed message when the alarm rings.

ATTENDANT STATION

Select the station of your choice to be the attendant. This station may be called by dialing 0.

AUTO ANSWER

When an 616 station is set into this mode, all intercom calls will automatically turn on the speaker and microphone for true hands-free answering. Each 616 keyset user may select either this mode or ring mode.

AUTOMATIC HOLD

Station users can enable or disable automatic hold at their keysets. While a user is engaged on an outside (C.O.) call, pressing another trunk key, route key or CALL button automatically puts the call on hold when this feature is enabled. Pressing the transfer key, conference key, page key or a DSS key will always automatically place the call on hold. This type of automatic hold is not a user-selectable option.

AUTOMATIC PRIVACY

All conversations on outside lines and intercom calls are automatically private. The privacy feature can be turned off on a per-line basis.

BACKGROUND MUSIC

When a customer-provided music source is connected, each keyset user may listen to background music. The HOLD button turns BGM on or off and the volume is controlled by the volume control keys. The music interface is located in the KSU.

BUSY LAMP FIELD (BLF)

DSS/BLF keys are assigned by default to all keysets. These buttons will be off when the station is idle, light red when that station is in use and flash distinctively when that station is in the DND mode.

BUSY STATION CALLBACK

When reaching a busy station, callers may request a callback by pressing one button or dialing a code. The system rings the caller back when that station becomes idle (a system-wide maximum of 100 callbacks are allowed at one time including busy station and busy trunk).

CALL FORWARDING

Station users can forward internal and outside calls to other destinations immediately (Forward All), when busy (Forward Busy) or if not answered in a programmable number of seconds (Forward No Answer). These forward destinations can all be different. Once a destination has been programmed, it can be turned on and off with a programmable key. Forward All takes priority over Busy and No Answer conditions.

In addition to the three usual methods of forwarding described above, a fourth option called Follow Me is available. This option allows a station user to set a Forward All condition from his/her station to another station while at the remote station.

To display the Follow Me condition, the transfer key lights steady red at the station that is forwarded. The transfer key also lights if Forward All is set and no key is programmed for Forward All.

Keyset users can be given an external call forward button to forward their calls to an external phone number. Each outside line may be programmed to either follow or ignore station call forwarding. A per-station option controls whether internal calls forward to voice mail or not. Single line telephones must have the system administrator program this feature for them.

FORWARD DND

Forward DND allows calls to a station in Do Not Disturb or One Time Do Not Disturb, to be forward immediately to another destination.

CALL PICKUP

With directed call pickup, a user can answer calls ringing at any station by dialing a code plus that extension number. The group pickup feature allows the user to answer any call ringing within a pickup group. Pickup keys may be customized with extenders to allow pickup from a specific station or pickup group. The DS 616 has 8 programmable pickup groups.

DIAL BY NAME

Each system and personal speed dial number can have an associated directory name. A speed dial number can be selected by scrolling alphabetically through the directory name list. This on-line “directory” allows the user to look up and dial numbers in seconds.

DIRECT STATION SELECTION (DSS)

By default, all stations are programmed with DSS keys, which are associated with the other extension numbers in the system. Users press these keys to call or transfer calls to the assigned stations.

DO NOT DISTURB (PROGRAMMABLE)

The Do Not Disturb (DND) feature is used to stop all calls to a station. System programming can allow or deny use of the DND feature for each station. Parties calling a station in DND will receive reorder tone. When in DND mode, calls may be forwarded to another destination. See Forward DND option. A keyset without a DND button can activate DND via the feature access code. The ANS/RLS key will flash at 112 ipm (rapidly) when DND is set.

There is a programmable option to allow a C.O. line to override DND at its ring destination if that destination is a single station.

DOOR LOCK RELEASE

Stations programmed to receive calls from a door phone can dial a code to activate a contact closure for control of a customer-provided electronic door lock.

EXCLUSIVE HOLD

Pressing HOLD twice will hold a call exclusively at a station so no other station can pick up that call. Intercom calls are automatically placed on exclusive hold.

GROUP LISTENING

This feature allows users to turn on the speaker while using the handset. It allows a group of people to listen to the distant party over the speaker without the microphone turned on.

HANDSET VOLUME CONTROL

For added convenience and comfort, the volume of the handset receiver can be adjusted on every keyset by pressing the volume UP/DOWN keys.

HEADSET OPERATION

Every keyset can be programmed to allow the use of a headset. In the headset mode, the hookswitch is disabled and the SPEAKER key is used to answer and release calls. Keyset users may turn headset operation ON/OFF by keyset programming or more easily by pressing the headset ON/OFF key. The headset key lights steady red when the keyset is in headset mode. The SPEAKER key lights if headset mode is activated by keyset programming only.

HEARING AID COMPATIBLE

All DS 616 keysets are hearing aid compatible as required by Part 68 of the FCC requirements.

LINE QUEUING WITH CALLBACK

When the desired outside line is busy, the user can press the CALLBACK key or dial the access code to place his/her station in a queue. The user will be called back when the line is available (a maximum of 100 callbacks are allowed system-wide at one time including busy station and busy trunk).

LINE SKIPPING

When the user is talking on an outside line and the automatic hold feature is turned off, he/she may press an idle line key and skip to that line without causing the previous call to go on hold.

MESSAGE WAITING LIGHT/INDICATION

When a message indication is left at a keyset, the MESSAGE button will slowly flash red. Single line telephones will receive a distinctive dial tone to notify them that a message is waiting. Message waiting indications can be left for any station or group of stations.

MUTE MICROPHONE/HANDSET

Any keyset user can mute the keyset's handset transmitter by pressing the MUTE key. In addition, keyset users can also mute the keyset microphone while the keyset is in speakerphone mode.

OFF-HOOK RINGING

When a keyset is in use, the system will provide an off-hook ring signal to indicate that another call is waiting. The ring signal is a single ring repeated. The interval is controlled by a system-wide timer. Single line stations will receive a tone burst through the handset receiver instead of a ring.

OFF-HOOK VOICE ANNOUNCE (STANDARD)

Keysets may receive a voice announcement while on another call. The calling station must have an OHVA key. When transferring a call to a busy keyset or while listening to busy signal, the station user can press the OHVA key to make an OHVA call to the busy keyset. If the called keyset is in the DND mode, it cannot receive OHVA calls.

ONE TIME DO NOT DISTURB

The Do Not Disturb (One Time) feature is used to stop all calls to a station when the user is on an outside line and does not want to be disturbed for the duration of the call. Upon completion of the call, DND is canceled and the station is returned to normal service. This feature requires a programmed button.

ONE TOUCH DIALING KEYS

Frequently used speed numbers can be assigned to one touch dialing keys for fast accurate dialing.

ON-HOOK DIALING

Any keyset user can originate calls without lifting the handset. When the called party answers, the user may speak into the microphone or lift the handset for more privacy.

PROGRAMMABLE KEYS

The DS 24D keysets have 24 programmable keys. By default, keys 1–6 are assigned a Direct Trunk keys. Key 7 is not assigned and key 8 is assigned as a MSG key. Keys 9–24 are assigned as DSS keys and are associated with the other extensions in the system.

Each key can be programmed for more than 25 different uses to personalize each phone. Examples of keys include individual outside line, individual station, group of lines, group of stations and one touch speed dial buttons. Using these keys eliminates dialing access codes.

The following feature keys have extenders that make them more specific: SPEED DIAL, SUPERVISOR, PAGE, DSS, DIRECTED PICKUP, GROUP PICKUP, DOOR PHONE, BOSS, PROGRAMMED MESSAGE, IN AND OUT OF GROUP, FORWARD

and VOICE MAIL TRANSFER. The extender can be a station, a group or another identifying number.

PROGRAMMED STATION MESSAGES

Any station may select one of twenty messages to be displayed at a calling party's keyset. Ten messages are factory-programmed and the remaining ten can be customized by the system administrator (16 characters maximum).

NOTE: The calling party must have a display keyset to view these messages.

PROTECTION FROM BARGE-IN

Each station can be programmed as secure or not secure. Secure stations cannot be barged-in on. A station that is not secure cannot be barged-in on when talking to a secure station.

PULSE TO TONE SWITCHOVER

When dialing a number on a dial pulse network, a station user can dial # and the DS 616 system will begin to send DTMF.

REDIAL

There are three types of external redial available to all station users. Each type can redial up to a maximum of 18 digits.

- AUTO RETRY—When an outside number is dialed and a busy signal is received, the auto retry feature can be used to reserve the outside line and automatically redial the number for a programmable number of attempts.
- LAST NUMBER—The most recently dialed number on a C.O. line is saved and may be redialed by pressing the redial key or dialing the LNR access code.
- SAVE NUMBER—Any number dialed on a C.O. line may be saved for redial at a later time.

REMOTE HOLD

When you wish to place a call on hold at another station, press TRSF and dial the station number (or press the appropriate DSS key). Press the HOLD key. This will place the call on system hold on an available CALL button or Line Key at the remote station.

RING MODES

Each keyset user can select one of three distinct ways to receive intercom calls. The phone can automatically answer on the speakerphone, voice announce through the speaker or receive ringing. When the ring mode is selected, keyset users can choose one of eight distinct ring tones. Forced Auto Answer is invoked by the calling station and is controlled by the calling station's class of service.

RINGING PREFERENCE

Lifting the handset or pressing the speaker button automatically answers a call ringing at the keyset. Using this method, users are assured of answering the oldest call first. When ringing preference is turned off, the user must press the flashing button to answer. Users may answer ringing lines in any order by pressing the flashing button.

SPEAKERPHONE

The DS 24D keysets have a built-in speakerphone. The speakerphone enables calls to be made and received without the use of the handset.

STATION CALLBACK

When the user reaches a busy station, a callback may be requested. The system rings the calling station back when the called station becomes idle.

STATION LOCK

With a programmable personal station passcode, any keyset can be locked and unlocked. A locked keyset cannot be used to make or receive calls.

STRAIN RELIEF CHANNELS

Both the handset and line cords are routed through channels in the bottom of the keyset. Pulling and stretching the cords will not dammage the modular plug or connector.

TRI-COLORED LIGHTS

DS 24D keysets have 24 keys equipped for tri-colored LED indications (green, red, and amber). To avoid confusion, your calls always light green, other calls show red and recalls light amber. All programmable keys on the DS 24D keysets have tri-colored LEDs.

VOLUME SETTINGS

Each keyset user may separately adjust the volume of the ringer, speaker, handset receiver, background music, page announcement and off-hook ring tone.

WALL-MOUNTABLE KEYSETS

Each keyset, add on module and 64 button module can be wall mounted by re-versing the base wedge.

DISPLAY FEATURES

ACCOUNT CODE DISPLAY
CALL DURATION TIMER
CALL FOR GROUP IDENTIFICATION
CALL PROCESSING INFORMATION
CALLER ID INFORMATION
CALLING PARTY NAME
CALLING PARTY STATION NUMBER
CONFERENCE INFORMATION
DATE AND TIME
DISPLAY DIALED NUMBER
ENHANCED STATION PROGRAMMING
IDENTIFICATION OF RECALLS
IDENTIFICATION OF TRANSFERRED CALLS
MESSAGE WAITING CALLER NUMBER
OUTSIDE LINE IDENTIFICATION
OVERRIDE IDENTIFICATION
PROGRAMMABLE STATION MESSAGES
SOFT KEYS
STOPWATCH TIMER

4.3 DISPLAY FEATURE DESCRIPTIONS

ACCOUNT CODE DISPLAY

Account codes are conveniently displayed for easy confirmation. If entered incorrectly, users may press the ACCOUNT key again and reenter the account code.

CALL DURATION TIMER

The system can automatically time outside calls and show the duration in minutes and seconds. Station users may manually time calls by pressing the TIMER button.

CALL FOR GROUP IDENTIFICATION

When a call is made to a station group, the display shows [CALL FOR GROUP] and the user's group number. These calls can be answered with a different greeting than calls to the user's extension number.

CALL PROCESSING INFORMATION

During everyday call handling, the keyset display will provide information that is helpful and in some cases invaluable. Displays such as [CALL FROM 203], [TRANSFER TO 202], [701: RINGING], [TRANSFER FM 203], [708 busy], [Camp on to 204], [Recall from 204], [Call for 501], [message from 204] and [FWD ALL to 204] keep users informed of what is happening and where they are. In some conditions, the user is prompted to take action and in other cases the user receives directory information.

CALLER ID INFORMATION

Caller ID information is dependent on the use of display keysets. The following list explains the displays that are used with Caller ID.

NAME/NUMBER DISPLAY

Each display keyset user can decide if he/she wants to see the Caller ID name or Caller ID number in the display. Regardless of which one is selected to be seen first, the N/N key is pressed to view the other piece of CID information.

NEXT CALL

In the event that there is a call waiting or a camped-on call at the user's keyset, the user can press the NEXT key to display the Caller ID information associated with the next call in queue at the station. Either the CID name or CID number will show in the display depending on the N/N selection.

SAVE CID NUMBER

At any time during an incoming call that provides CID information, the user may press the SAVE key. This saves the CID number in the Save Number feature. Pressing the SAVE number redial key will dial the CID number. The system must be using LCR to dial the saved number.

STORE CID NUMBER

At any time during an incoming call that provides CID information, the user may press the STORE key. This saves the CID number as a speed dial number in the personal speed dial list. The system must be using LCR to dial the stored number.

INQUIRE PARK/HOLD

When a user is informed that an incoming call is on hold or has been parked, the user may view the Caller ID information before he/she retrieves the call. This will influence how the user chooses to handle the call.

CID REVIEW LIST

This feature allows display keyset users to review CID information for calls sent to their stations. This list can be from ten to fifty calls in a first in, first out basis. The list includes calls that were answered and calls that rang the user's station but that were not answered. When reviewing this list, the user can press one button to dial the person back. The system must be using LCR to dial the stored number.

INVESTIGATE

This feature allows selected stations with a special class of service to investigate any call in progress. If CID information is available for an incoming call, the selected stations can know to whom the investigated user is speaking. On outgoing calls, the selected stations can see who was called. After investigating, the selected stations may barge-in on the conversation, disconnect the call or hang up.

ABANDON CALL LIST (100)

The DS 616 has a system-wide abandon call list that stores CID information for the last 100 calls that rang but were not answered. The list is accessed using the operator's passcode. When reviewing this list, the user is provided options to CLEAR the entry or DIAL the number. The user can use the NND key to toggle between the CID name, CID number and the date and time the call came in. The system must be using LCR to dial numbers from the abandon call list.

CALLING PARTY NAME

For intercom calls, display keysets show the calling party's name before answering. The names must be stored in the system directory list and can be up to 11 characters long.

CALLING PARTY NUMBER

When an intercom call is received, all display stations show the calling party's extension number before the call is answered.

CONFERENCE INFORMATION

When a conference is set up, each extension and outside line number is displayed at the controlling station when it is added. When a station is added, its display shows [Conf with xxx] alerting the user that other parties are on the line.

DATE AND TIME DISPLAY

In the idle condition, the current date and time are conveniently displayed. Display keysets can have a 12 or 24 hour clock in either the ORIENTAL or WESTERN display format with information shown in upper case or lower case letters.

DIALED NUMBER

When an outside call is made, digits are displayed as the user dials them. If the display indicates an incorrect number was dialed, the user can quickly hang up before billing begins.

ENHANCED STATION PROGRAMMING

Personal programming options are easier to select and confirm with the help of the display.

IDENTIFICATION OF RECALLS

Hold recalls and transfer recalls are identified differently than other ringing calls. Hold recalls indicate the recalling line or station number and the associated name. Transfer recalls indicate the recalling line or station and where it is coming from.

IDENTIFICATION OF TRANSFERS

The display will identify who transferred a call to the user.

MESSAGE WAITING CALLER NUMBER

When the message indication is on, pressing the MESSAGE button displays the station number(s) of the person(s) who have messages for the user. Display keyset users can scroll up and down to view message indications.

OUTSIDE LINE IDENTIFICATION

Each line can be identified with an 11 character name. Incoming calls display this name before the call is answered. This feature is helpful when individual lines must be answered with different greetings.

OVERRIDE IDENTIFICATION

If another station barges-in on a user's conversation, the display will alert the user with a [Barge from 2xx] display if the system is set for barge-in with tone.

PROGRAMMED MESSAGE DISPLAY

Preprogrammed station messages set by other stations are displayed at the calling station's keyset.

SOFT KEYS

Below the display, there are three soft keys and a SCROLL button. These keys allow the user to access features in his/her class of service without requiring the keyset to have designated feature keys.

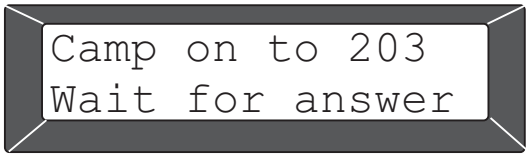
STOPWATCH TIMER

Display keyset users find this feature very convenient to time meetings, calls and other functions. Users simply press once to start the timer and press again to stop the timer.

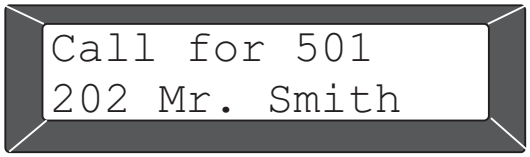
4.4 SAMPLE DISPLAYS

All display model keysets have a 32 character liquid crystal display. Helpful call processing information is provided so everyday call handling is quick and easy. Here are just some of the displays you may see.

Idle display shows extension, name, day, date and time.



This station is camped-on to extension 203 and is waiting for 203 to answer.

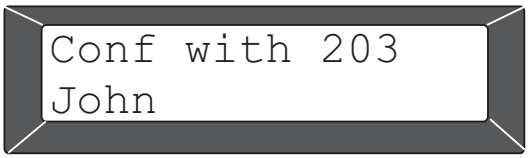


This station in the sales department is receiving a group call from Mr. Smith.

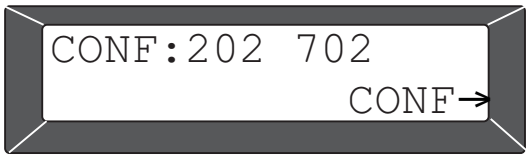
This display tells you this is a new incoming call to the sales department.

This station is calling station 203 which is currently busy.

This station is receiving an off-hook voice announcement from station 203.



This station is on a conference call with John, extension 203. Assume other parties will hear your conversation.



This station is on a conference call with extension 202 and trunk 702 and has the option to add two more parties.

This station is transferring a call to John at extension 203.

This station is receiving a call from extension 201.

This station is setting the Do Not Disturb feature.

This station is speaking on trunk 703.

4.5 SAMPLE CALLER ID DISPLAYS

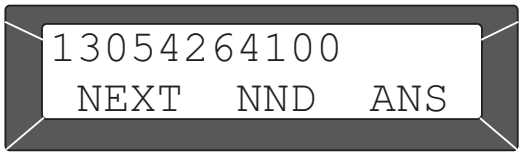
This display shows an incoming call from 1-305-426-4100 on Line 702 ringing directly at your station.

This display shows the information on the abandoned call list. This call came in on May 25 at 9:41 A.M. on line 702. The user can CLEAR the entry, DIAL the caller back or examine further NND information.

This display shows a call from 1-305-426-4100 that has been transferred to you from station 201.

This display shows an entry in a station review list showing the three initial options. The arrow indicates other options available to you by pressing the SCROLL key.

This display shows an investigation of a station that is talking to Samsung Telecom. Investigator can BARGE-in to the conversation, DROP the call from the system or examine further NND information.



This display is seen while examining calls in queue at your keyset.

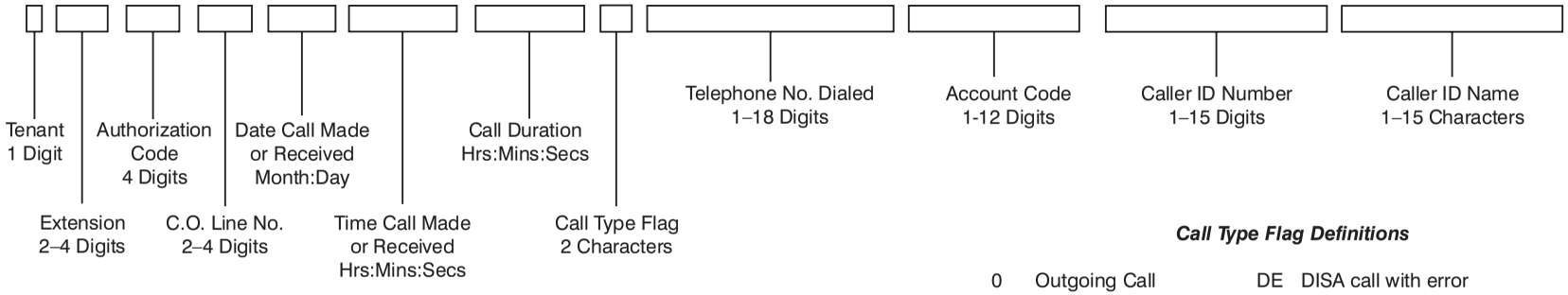
This display shows an incoming call from Samsung Telecom ringing at group 500.

This display can be seen when investigating an intercom call. The investigator can BARGE-in or DROP the connection.

This display is seen while using the INQUIRE feature. It shows the three options available while you are checking on a held or parked call.

SMDR REPORT FOR [CID Sample] 01/02/95 17:12

EXT	AUTH	TRK	MM/DD	STT.TIME	DURATION	FG	DIALED DIGIT	ACCOUNT CODE	CID NUMBER	CID NAME
201		701	01/02	17:15:13	00:00:28	IT			13054264100	SAMSUNG TELECOM
205		701	01/02	17:15:41	00:00:02	T			13054264100	SAMSUNG TELECOM
217		702	01/02	17:24:49	00:00:25	IT			13055557890	CURTIS SMITH
202		702	01/02	17:25:14	00:00:03	T			13055552354	SUSAN HOLLINS
202		702	01/02	17:25:56	00:00:00	O	4264100			
217		702	01/02	17:26:35	00:00:11	IT			13054264385	SAMSUNG TELECOM
203		702	01/02	17:26:46	00:00:16	T			13054264385	SAMSUNG TELECOM
203		702	01/02	17:27:13	00:00:20	O	4264385			
203		702	01/02	17:28:04	00:00:00	O	4264385			
201		701	01/02	17:28:34	00:00:04	IT			13055559748	JOAN LEVIN
203		701	01/02	17:28:38	00:00:14	T			13055558703	LENNY WILKINS
203		702	01/02	17:29:54	00:01:27	OT	5556420			
205		702	01/02	17:31:06	00:03:00	TT			13055556420	PIZZA DELIVERY
209		702	01/02	17:33:24	00:02:18	T			13055556420	PIZZA DELIVERY
		701	01/02	17:41:45	00:00:30	A			13055553426	TERRY PRUITT
		701	01/03	17:42:15	00:00:02	A			13055554676	BLANCHE MARKER
203		701	01/03	17:51:17	00:00:22	O	5554069			
		701	01/03	17:56:02	00:00:05	A			13055556733	ALEX DAULTON
		701	01/03	17:56:07	00:00:54	A			13055559723	CHAZ NEWMAN



Call Type Flag Definitions

0	Outgoing Call
I	Incoming Call
DI	DISA call in
DO	DISA call out
FO	Outgoing record of forwarded call
A	Abandoned call
DE	DISA call with error
T	Transferred call that was terminated
IT	Incoming transfer
FI	Incoming call forwarded to an external number
OT	Outgoing transfer Outgoing call made and transferred
TT	Caller received a transferred Call and transferred it again

4.6 SAMPLE SMDR PRINTOUT

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PART 5. GENERAL USER INFORMATION

5.1 RADIO FREQUENCY INTERFERENCE

WARNING: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy. If not installed and operated in accordance with the instruction manual, it may cause interference with radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

The following measures can be tried:

1. Reorient the receiving antenna.
2. Relocate the telephone with respect to the receiver.
3. Move the telephone equipment away from the receiver.
4. Plug the Key Service Unit into a different AC outlet so that the KSU and receiver are on different circuits.

5.2 FCC REQUIREMENTS

The DS 616 Private Automatic Branch Exchange (PABX) system complies with part 68 of the Federal Communications Commission Rules and Regulations.

UNAUTHORIZED MODIFICATIONS

Any changes or modifications performed on this equipment that are not expressly approved in writing by SAMSUNG TELECOMMUNICATIONS AMERICA could cause noncompliance with the FCC rules and void the user's authority to operate the equipment.

NOTIFICATION TO TELEPHONE COMPANY

The customer must notify the telephone company of the particular line to which the connection will be made and provide it with the FCC registration number and the Ringer Equivalence Number (REN) of the protective circuit. On the right side of the PABX System is a label that contains the FCC registration number and ringer equivalence number (REN) for this equipment.

FCC Registration Numbers: A3LKOR
Ringer Equivalence Number: 0.5 B

TELEPHONE CONNECTION REQUIREMENTS

The Federal Communications Commission (FCC) has established rules which permit the DS 616 to be connected directly to the telephone network using telephone company network access jacks.

5.3 TELEPHONE COMPANY INTERFACES

CIRCUIT TYPE	FIC	NETWORK JACK
C.O. LINE—LOOP START	O2LS2	RJ21X RJ11C

NOTE: Allowing this equipment to be operated in such a manner as to not provide for proper answer supervision is a violation of part 68 of the FCC's rules.

RINGER EQUIVALENCE (REN)

The REN is used to determine the quantity of devices which may be connected to the telephone line. Excessive RENs on the telephone line may result in the devices not ringing in response to an incoming call. In most but not all areas, the sum of the RENs should not exceed 5.0. To be certain of the number of devices that may be connected to the line, as determined by the number of RENs, contact the telephone company to determine the maximum REN for the calling area.

INCIDENCE OF HARM

If the terminal equipment, the DS 616 causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice is not practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

CHANGES TO TELEPHONE COMPANY EQUIPMENT OR FACILITIES

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make the necessary modifications so that you may maintain uninterrupted service.

SERVICE CENTER

If trouble is experienced with the DS 616, please contact your local SAMSUNG TELECOMMUNICATIONS AMERICA at (305) 592-2900 for repair or warranty information. If the trouble is causing harm to the telephone network, the telephone company may request that you remove the equipment from the network until the problem is resolved.

FIELD REPAIRS

Only technicians certified on the DS 616 are authorized by SAMSUNG TELECOMMUNICATIONS AMERICA to perform system repairs. Certified technicians may replace modular parts of a system to repair or diagnose trouble. Defective modular parts can be returned to SAMSUNG TELECOMMUNICATIONS AMERICA for repair.

GENERAL

This equipment must not be used on coin telephone lines. Connection to party line service is subject to state tariffs.